

# *The Aesthetic and Recreational Values in Botanical Gardens*

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## Part 4

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### ECONOMIC VALUES

The economic values of present day botanic gardens evolve directly from the research and scientific projects carried on within them; in this connection it is important to note that the term *economic* carries in many cases the meaning of the term *application of scientifically gained information*.

In historical gardens, outstanding economic gains were made by propagation and distribution of new or unusual plants. The guidance of the various botanic gardens in the use of these plants has led to significant results in history, even to changes in national economics concerned. Perhaps the first work of that kind accomplished was the introduction of the breadfruit tree from Pacific tropical islands to the West Indies in 1791 by a Kew gardener, Christopher Smith. Two other remarkable successes in this section of the work of Kew Gardens have been the introduction of quinine to India and of Para rubber to the Malay Peninsula. The experiment of introducing the quinine plant from Peru to the hill countries of India was undertaken in 1860. This achievement has been considered one of the most successful and most profitable of its kind. When it is remembered that this drug (quinine) was for many years the only specific for malarial fever, the commonest and most often fatal of tropical diseases, it will be realized how great a service the reduction in the cost of this drug has been to dwellers in the tropics. Its present price is about one-sixteenth of what it was in 1860.

In comparatively recent times, few articles of tropical origin have been put to so many uses and become so nearly indispensable to civilization as rubber. Most valuable of the rubber yielding plants is the Para rubber tree, *Hevea brasiliensis*, native to Amazonian forests of Brazil. Since the natural supplies of this product, though immense, were all but inaccessible, the authorities at Kew Gardens determined to create fresh sources. In 1875, seeds of this plant were sent to Kew, and from these seeds a thousand plants were grown and delivered to Ceylon and the Malay Peninsula, there to provide the basis for one of the great industries, not only of the East but of the whole civilized world. Among smaller but still important products which may be credited in major part to the work of botanic gardens are cocoa and tea. In 1880, plants of *Theobroma cacao* were sent to Ceylon from Trinidad, to lay the foundation for a new source of supply; at this time the great bulk of cocoa came from South America. The tea industry of Natal was still another which had its beginning in plants obtained from Kew.

Modern botanic gardens experiment with matters having aspects of economic importance, and although their achievements may seem less dramatic than those of earlier times in affecting the history and industry of nations, nevertheless they are of definite and positive value. Generally, a major concern today lies in improving the performance and characteristics of many different plants. The particular purpose of the Eddy Arboretum in Placerville, California, is the breeding of pines by the use of genetic principles for improved timber production; the hope in this work is to produce faster growing pines for lumber, and for reforestation, and to combine with rapidity of growth such features as wood quality and resistance to insects and disease. Another current project of applied research has to do with horticultural uses of plant hormones. Here the



focus is upon various means of propagation and rooting of cuttings. Tests of the use of gibberellic acid have shown interesting responses in the increase of fruit size, and an increase in the speed of germination. At Manitoba the Experiment Station, active in growing fruits and ornamental species, has issued a quantity of valuable information regarding new and improved varieties of hardy material.

Thus it seems apparent that the "applied scientific" advancement in botanic gardens is of economic interest and importance in the present day just as it has been historically.

#### EDUCATIONAL VALUES

"An arboretum or botanical garden," in the words of Donald Wyman of the Arnold Arboretum, "may be used for public enjoyment and recreation, but is primarily established for the education of the public." Plants are properly labeled as well as recorded, usually with a certain amount of information about the plants themselves, about their culture, and about their ornamental or economic use. In botanic gardens the effort has been to plant and maintain an extensive collection of many kinds of labeled plants for critical examination, for scientific study, and for the education of the public.

Of the objectives stated by botanic gardens and arboreta, that one which most clearly indicates educational intent seems to be, "To disseminate knowledge of plants to the public." This "knowledge" generally includes information regarding plant identification, appearance, and culture. In addition, some gardens sponsor a continual display of those plant varieties which might prove to be the most valuable and adaptable to the various uses in a given climate (*i.e.*, shade trees, wind barriers, city beautification).

Dr. John Merle Coulter, in a dedicatory address delivered at the Brooklyn Botanic Garden in 1917, spoke of the educational service contribution of a botanic garden. He said, in part:

Nature is a great teacher when she really comes in contact with the pupil. The notion is all too prevalent that knowledge comes from books, that one can read about nature and acquire knowledge of nature. Knowledge comes from experience. We must distinguish between knowledge and information. Knowledge is firsthand, obtained from actual contact with the material. Information is second-hand, hearsay, coming from no actual experience. Reading about plants therefore brings information; contact with plant material brings knowledge. To serve a community by bringing its children into contact with nature and plants is a great educational service.

Specifically, the public may draw educational value from a botanic garden in a number of ways. An individual may visit a garden out of curiosity, to see and learn what a botanic garden is and does. This might well be termed the casual approach: the knowledge gained is incidental, and the person is likely to be seeking enjoyment rather than education directly. A second reason for visitation may be to seek knowledge purposefully, of some aspect of plant study; with this purpose the intensity of interest of course varies with the persons concerned. The belief is rather generally held among botanic garden and arboretum administrators, at least, that "only by providing an educational experience for each visitor is mere existence justified." Such experience accrues indirectly to the botanical garden visitor in the observation of correctly labeled plants, information signs, botanical and horticultural displays, publications, automatic slides and motion pictures, taped informational talks, and even trail signs, to mention but a few. Direct education may be offered in a number of ways: information centers at the gatehouse or garden entrance, guided tours by information aides (docentry), guided tours by other staff members for special groups, educational field trips, and by individual consultations as well as the special and regular classes.

In many of the present day botanic gardens, regular classes are held both for children and for adults. One group of people who have been quick to take advantage of this



service includes home owners, who come to see and hear and gather ideas on "how to plan or "how to do" for themselves, either visually in demonstration home gardens, or audibly and visually by attending a class which offers explanation of some phase of plant study or of landscape design. A person who is eager to learn more about a hobby may take courses in orchid culture, tree identification, botanical sketching, plant pathology, or birds and plants as they relate each to each, among others. For the children, actual participation in gardening and study of plant life is often available, with talented and able supervision; says Wooley, "young people are eager to learn, and these subjects have a waiting list long before the starting date." Lectures by staff members are presented in many modern gardens, to various garden clubs and nursery organizations. In this way, particularly, valuable information is disseminated with regard to new plants and their horticultural requirements. Plant research of course serves education as do also the many published articles sponsored by most present day botanic gardens. Lastly, an increasing use of the botanic garden as a main center of horticultural information, much in the same way as the reference department of a library, is indicated by the numbers of telephone calls from people desiring limited information or answers as to where certain information may be located. Clearly, these are educational services.

It is of some interest to note that the very early botanic gardens contributed to public knowledge by providing labeled specimens, but that courses for the public and instruction by experienced teachers are relatively new contributions. In the gardens of the past, actual instruction was offered only to regular students of pharmacy, botany, or related subjects; the Padua Garden is believed to have been the first of these, about 1545.

Information aides (docentry) are said to be a comparatively new idea in the program of education; they are found mainly in those institutions devoting a considerable portion of time to the popularizing of knowledge. Under this system, a regularly appointed "docent" travels a definite route throughout the garden at a specified time each day. Groups of people may start with the docent, or he may in turn meet with two or three interested visitors, volunteer information concerning the trees and plants of the collection, "and thus assemble an extempore class."

The botanic garden can be said, then, to be a valuable source of knowledge to casual visitors as well as to horticulturists and plant scientists and to student groups interested in various phases of plant study. For specific examples of the educational programs now being conducted in outstanding botanical gardens of today, the following descriptions are offered in the knowledge that fully described programs would require many more pages than are available here.

Botanic gardens associated with a university or college were developed, in the majority of instances, with education as one of their main objectives. Association with a university is often an advantage in that it tends to assure permanence to a botanic garden or arboretum; further, sound and intelligent advice on problems of the garden is sure to be available from university staff and faculty, while the garden can serve as an ideal out-of doors laboratory to augment classroom instruction. Facilities offered by a botanic garden are often used to greater advantage as a result of this association, than might otherwise be the case. The botanic garden at the University of California at Berkeley, for instance, which lists teaching as one of its chief functions, serves, in addition to its other functions, as a source of plant materials required for class instruction in many of the departments of the university. The same is true of the botanic garden on the Los Angeles campus of the University of California.

The New York Botanical Garden, affiliated with Columbia University, indicates its educational purpose by the following comment:

This great scientific institution is actively engaged in fulfilling the needs, of



plant education . . . of a great urban metropolis. Its display, greenhouses, formal beds, rock garden, and various scientific exhibits are all carefully presented to the public to promote an interest in—and a greater appreciation of—plants.

Lectures, tours, and classes for adults are all part of the program. The great herbarium and library are constantly in use by students from all fields.

A garden with similar purpose but not connected with a university is the Brooklyn Botanic Garden. Donald Wyman has written,

. . . this botanic garden, situated in the heart of a great city, has been doing a splendid work in child and adult education . . . Urban dwellers who come in contact with the garden receive benefit from its interest in teaching of horticulture and the lore of growing plants. No botanic garden could be in more difficult environs, yet possibly because of this, the Brooklyn Botanic Garden continues to render to the people of Brooklyn a real service in teaching the appreciation and beauty of plants as well as their culture.

The Morton Arboretum in Illinois, listing education as its chief function, places considerable emphasis on the establishment of clearly marked nature trails and, interestingly, in the education of children. Classes are given, however, not only for the general public but for instructors in plant study as well. Walks, tours, lectures, and photographic contests are among the ways of interesting pupils as well as their teachers in the plants of the arboretum. Classes in gardening, nature study, and landscape design are conducted for the benefit of all. Valuable information can be learned from the Morton Arboretum as to methods used in its various phases of public education.

The Bowman Hill State Wild Flower Preserve, of Pennsylvania, is said to demonstrate clearly "how effective a well managed cooperative effort can be in education for plant conservation." This garden places exceptional stress on the importance and need for conservation, as its objective, through a comprehensive program of education for increased appreciation of wild flowers and native plants. Those interested in wild flower conservation and display may learn techniques in this garden, especially for labeling and for maintaining and protecting the various collections.

As has been stated, the majority of the botanic gardens in operation today provide some form of program to educate the public in one or many phases of plant study. To list them all or to mention all the ways in which they provide this service would again, as with the many scientific values, produce volumes of information unnecessary to attest further to the educational riches available from botanic gardens. The energies of many people connected with the educational aspects of plant study are boundless, in spite of sometimes limiting funds and resources. To mention the efforts of one garden is not to slight another not mentioned, but only an attempt to give an interesting and clear, but concise, picture of the abundant values and the even greater potential offered by these institutions.

(To be continued)

## THE CLIMATIC OCCURRENCE OF TWO EUCALYPTUS SPECIES

GERALD W. GAUSE

The distribution of any flora depends mostly on the climate in which it is found. The Australian continent displays a variety of climates suitable for varied types of plant communities.

Out of the six hundred known endemic species of Eucalyptus on the Australian continent, there are two which have the widest geographical distribution throughout all of the climatic regions. The species we are concerned with are highly adaptable and include; *Eucalyptus transcontinentalis*. Maiden. (The Boongul) and *Eucalyptus camaldulensis*,





Morel, Elizabeth Ann. 1962. "The aesthetic and recreational values in botanical gardens: part 4." *Lasca leaves* 12(Autmn 1962), 80–83.

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